MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2016/2017

PMC0075 – CALCULUS

(All sections / Groups)

27 FEBRUARY 2017
2.30 p.m. – 4.30 p.m.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of **THREE (3)** printed pages including the cover page with 4 questions only.
2. Answer all **FOUR (4)** questions
3. Write all your answers in the answer booklet provided.
4. Only NON-PROGRAMMABLE calculators are allowed.

Question 1 (25 Marks)

a) Evaluate the indicated limit, if exist.

i. $\lim_{x\to 0}(x^2-3x+1)$ **(3 marks)**

ii. $\lim_{x\to -1} f(x)$ where $f(x)=\begin{cases}x^2+1; x<-1\\ 3x+1; x\geq -1\end{cases}$ **(4 marks)**

iii. $\lim_{x\to -1}\dfrac{x^2+3x+2}{x^2-x-2}$ **(5 marks)**

iv. $\lim_{x\to \infty}\dfrac{2x^2-x+1}{4x^2-3x-1}$ **(6 marks)**

b) Determine whether the function is continuous at the given point. If not, state the reason.

$$f(x)=\begin{cases}x^2; x<2\\ 3; x=2\\ 3x-2; x>2\end{cases} \quad \text{at } x=2$$ **(7 marks)**

Question 2 (25 Marks)

a) Differentiate the following using appropriate rule.

i. $f(x)=(x^2+3)(x^3-3x+1)$ **(6 marks)**

ii. $f(x)=(x^2+2x+1)^2$ **(4 marks)**

b) Find y' given $x^2y^2+3y=4x$. **(5 marks)**

c) Find the intervals where the function is increasing and decreasing. **(10 marks)**

$$f(x)=x^3-3x^2-9x+1$$

Continued...

Question 3 (25 Marks)

a) Find the general antideriavtive of the following.

i. $\int (3x^4 - 3x - 1)dx$ **(2 marks)**

ii. $\int (4x - 2e^{2x})dx$ **(3 marks)**

b) Compute each integral.

i. $\int_0^2 (x^3 + 3x - 1)dx$ **(5 marks)**

ii. $\int_0^2 (x\sqrt{x^2 + 1})dx$ **(8 marks)**

c) Find the area bounded by the curves $y = 2x$ $(x > 0)$ and $y = 3 - x^2$. **(7 marks)**

Question 4 (25 Marks)

a) Solve the following differential equation.

i. $\frac{dy}{dx} = e^{3x+2y}$ **(5 marks)**

ii. $x\frac{dy}{dx} - 2y = 10x^3$ **(9 marks)**

b) Find the general solution of the following.

i. $y'' - 2y' + y = 0$ **(3 marks)**

ii. $y'' + y' - 2y = 5e^{3x}$ **(8 marks)**

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